Consultants

REPORT ON INSTALLATION OF OBSERVATION WELLS WCC-11S AND WCC-12S AT DOUGLAS AIRCRAFT COMPANY'S FACILITY IN TORRANCE, CALIFORNIA

Prepared for:

Douglas Aircraft Company
4900 Airport Plaza Drive
Long Beach, California

Prepared by:

Woodward-Clyde Consultants
2020 East First Street, Suite 400
Santa Ana, California 92705

Project No. 8941863J
March 1992

BOE-C6-0091738

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDIXES

1.0
INTRODUCTION

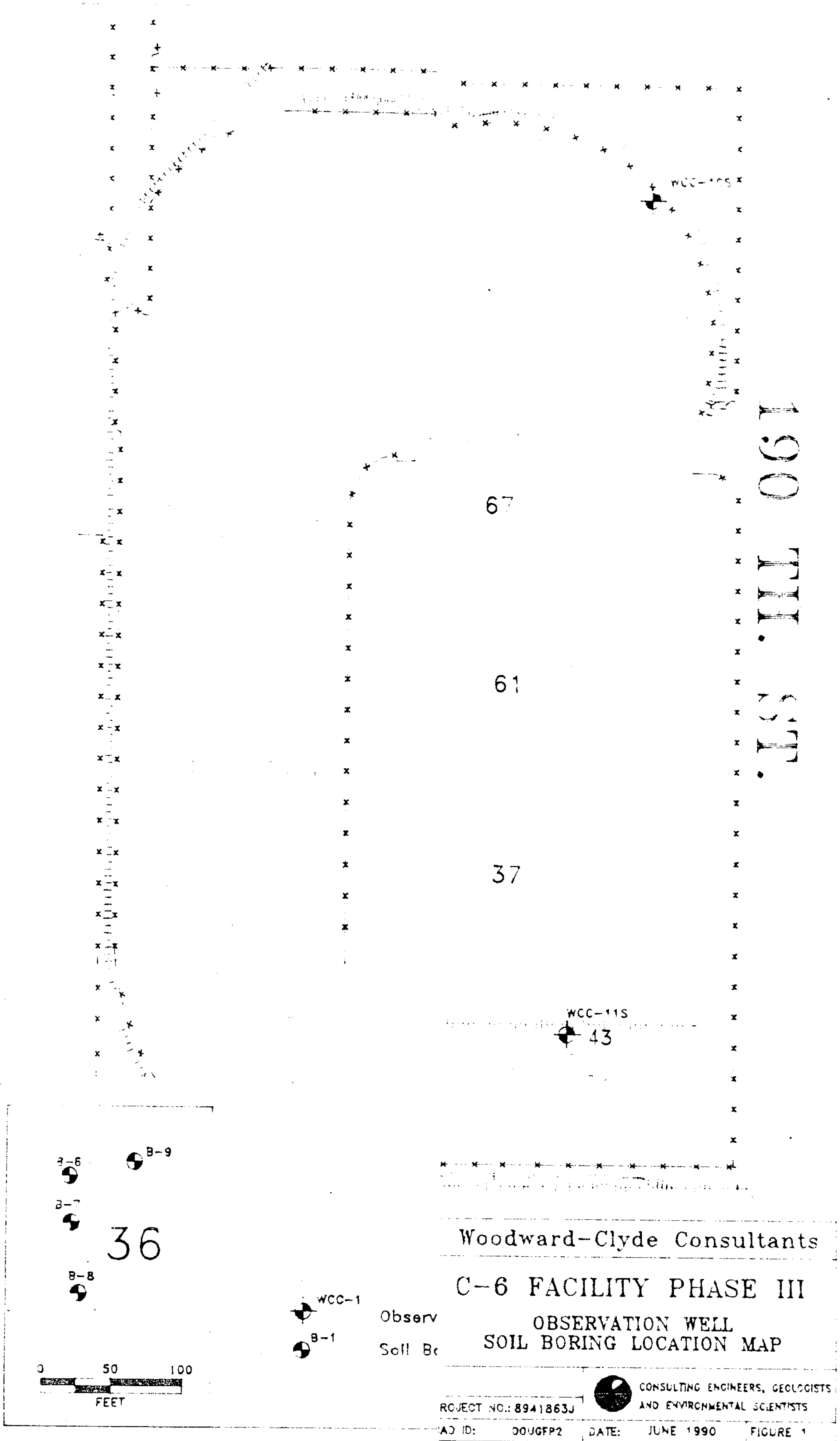
As part of the soil and groundwater monitoring investigation at Douglas Aircraft Company's Torrance (C-6) facility located at 19503 S. Normandie Avenue, Los Angeles, California, Woodward-Clyde Consultants (Woodward-Clyde) installed two additional observation wells (WCC-11S and WCC-12S) at the facility. These wells were installed to help delineate the extent of organic compounds in the groundwater, in the vicinity of Tanks 15T to 18T at this facility. Locations of observation wells WCC-11S and WCC-12S (along with the locations of existing observation wells) are shown on Figure 1. The wells were developed and sampled, and the analytical results obtained from sampling the wells are also presented in this report.

BOE-C6-0091740

FIGURE 1

OBSERVATION WELL/SOIL BORING LOCATION MAP

BOE-C6-0091741



Woodward-Clyde Consultants

C-6 FACILITY PHASE III

OBSERVATION WELL
SOIL BORING LOCATION MAP

CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS

ROJECT NO.: 8941863J			
AD ID: DOUGFP2	DATE: JUNE 1990	FIGURE 1	

2.0
FIELD PROCEDURES

2.1 DRILLING AND SOIL SAMPLING

The two observation wells (WCC-11S and WCC-12S) were drilled during the period September 12 to 17, 1990 at the C-6 facility. They were advanced to approximately 90 feet below ground surface. Soil samples were collected at 5-foot intervals using a modified California sampler. The collected soil samples were delivered to West Coast Analytical Services, a State-certified laboratory for analysis. Drilling, soil sampling and equipment documentation procedures, are presented in Appendix A. Boring logs are presented in Appendix B.

2.2 WELL INSTALLATION

Observation wells WCC-11S and WCC-12S were installed to a depth of approximately 90 feet below ground surface using a 10-inch outside diameter hollow stem auger. The depth of the uppermost water bearing zone was encountered at approximately 68 feet below ground surface. The observation wells were constructed of 4-inch outside diameter PVC casing and well screen. The well casing and screen were flush-threaded; PVC cement was not used to couple the casing. A sieve analysis was performed on a representative sample of the water bearing unit from each observation well. The results of this analysis were used to select an appropriate sand pack and screen perforation for the observation wells (Appendix B). After installation, the observation wells were developed by bailing groundwater until it was free of suspended matter and water temperature, pH, and electrical conductivity had stabilized. Groundwater samples were collected on October 10, 1990.

BOE-C6-0091743

3.0
LABORATORY RESULTS

Soil samples collected from the observation well borings at the water table were analyzed for volatile organic compounds (VOCs) by EPA Method 8240. Groundwater samples collected from the observation wells WCC-11S and WCC-12S were also analyzed for VOCs by EPA Method 624. Full laboratory analytical reports are presented in Appendix C. The soil analytical results, summarized in Table 1, indicate low concentrations of trichloroethylene (TCE) in the soil samples at the water table. No other VOCs as necessary by EPA Method 8240 were detected in the soil samples.

A trip blank and three groundwater samples collected from the observation wells were analyzed for VOCs by EPA Method 624. One sample (WCC-11S-1B) was collected from observation well WCC-11S and two water samples (WCC-12S-1B and WCC-12S-1C) were collected from observation well WCC-12S. The groundwater analytical results are summarized in Table 2. Several chlorinated hydrocarbons were detected in the water samples, with trichloroethylene and 1,1-dichloroethene present at the highest concentrations.

BOE-C6-0091744

TABLE 1

CONCENTRATIONS OF VOCs IN SELECTED SOIL SAMPLES

Sample No.	Sample Depth (feet)	TCE (mg/kg)
WCC-11-14-3	70	9
WCC-12-14-3	70	14
WCC-12-15-3	75	26

TABLE 2

SUMMARY OF ANALYTICAL RESULTS FOR GROUNDWATER SAMPLES(1)

Sample No.	Concentration (µg/l)(2)							
	1,1-DCE	1,1-DCA	1,1,1-TCA	TCE	trans-1,2-DCE	Chloroform	Benzene	cis-1,2-DCE
WCC-11S-1B	3	<1	<1	21	<1	<1	<1	1
WCC-12S-1B	1,100	15	86	1,700	15	8	5	36
WCC-12S-1C	930	12	73	1,500	13	7	4	31

NOTES:

(1) Samples analyzed by EPA Method 624.
(2) 1,1-DCE = 1,1-dichloroethene
1,1-DCA = 1,1-dichloroethane
1,1,1-TCA = 1,1,1-trichloroethane
TCE = trichloroethene
trans-1,2-DCE = trans-1,2-dichloroethene
cis-1,2-DCE = cis-1,2-dichloroethene

BOE-C6-0091745

4.0
CONCLUSION

The analytical results indicate that the southern and western extent of the plume has not been completely delineated, but the northern and eastern extent of the plume has been roughly defined.

BOE-C6-0091746

BOE-C6-0091747

APPENDIX A

FIELD PROCEDURES

BOE-C6-0091748

Samples analyzed, including QA/QC samples and blanks, were given a unique sample number. A listing of sample numbers, cross-referenced to chain-of-custody and shipment documents, were maintained in the field notebook.

For each soil sample, a unique identification number was used. The project sample number was used for tracking the sample in the field, tracking of the sample and subsequent analytical data results in the laboratory, and presentation of data in the report.

Documenting Sample Locations

Collected samples were documented in a field notebook , which was submitted to the project manager after completion of the sampling program. The site conditions at the time of sampling was documented in the field notebook, including weather conditions, temperature, time of sampling, and type of samples. Any unusual conditions was brought to the attention of the field manager and the same was recorded in the field notebook. The field notebook was always in the possession of the sampling crew leader and during non sampling periods was stored in a safe place. Samples were collected from predesignated locations. Any deviation was made with the consent of the project manager.

A.1 SAMPLING AND WELL INSTALLATION PROCEDURES

This section provides the procedures which were followed for the soil and groundwater sampling. Details of borehole drilling, well installation, and well development were also described.

BOE-C6-0091749

Soil Sampling Protocol

Borings were advanced using a CME-75 with a 10-inch outside diameter hollow stem auger. Soil samples were collected at 5-foot intervals. When the desired depth was reached, the rods were retrieved and a soil sample was obtained with a modified California sampler. Samples were advanced 18 inches by repeated drop of a 140 pound hammer. Blow-counts were recorded. The samplers were decontaminated, after collection of each sample as follows:

- Brush-assisted water rinse to remove soil and mud
- Brush-assisted water wash with Liquinox
- Deionized water rinse to remove Liquinox
- Second deionized water rinse
- Drying with paper towels.

Sample collection and lithologic description utilized soil contained within four 4-inch brass tubes held within the modified California sampler. The third tube was capped immediately and preserved on ice for shipment to the laboratory. Samples from the upper and lower rings were utilized for lithologic description and headspace analysis. One of the brass tubes was emptied into a zip-loc bag and analyzed for headspace and screened with an OVA.

A.2 WELL INSTALLATION AND SAMPLING

Observation wells were installed upon completion of the soil boring using the drill rig equipped with the hollow-stem augers. The augers were steam cleaned prior to use at the site. The geologist on site recorded soil characteristics, sample locations, and drilling information on boring logs.

Observation wells were constructed of Schedule 40 PVC 4-inch outside diameter screen and blank casing. A 30-foot screen extended from the bottom of the boring (approximately 90 feet) to approximately 60 feet below ground surface and had a slot

BOE-C6-0091750

size of 0.010 inch. The casing was suspended just above the bottom of the borehole and the annular space was backfilled with a filter pack of No. 0/30 Monterey Sand to a level approximately 3 to 4 feet above the top of the screen. Approximately 2 feet of bentonite pellets was placed in the annulus above the filter pack, hydrated with bottled water, followed by a slurry of cement and bentonite or enviroplug bentonite to about 2 feet below the surface. A traffic-rated well cover was grouted in place, flush with the surface using cement, and the wells were fitted with locking well caps.

Observation wells were developed using a surge block and bailer. At least three to five casing volumes of water were removed during development, while measuring water quality parameters (pH, conductivity, and temperature). Development was considered complete when the water quality parameters stabilized. Stabilization was achieved when the pH was constant within 0.1 units and conductivity did not vary by 10 percent from the previous reading.

Prior to water sampling, the wells were purged of at least three well casing and filter pack volumes and monitored for stabilization. Each well was bailed and sampled utilizing a Teflon bailer. Rope used during bailing was discarded after use in each well. The sampling containers are outlined in Section A.3. Sampling was analyzed according to EPA Method 624.

Water and cuttings removed during development, purging and drilling were retained and sealed in 55-gallon DOT drums. Based on water quality and soil analytical results, disposition consisted of on-site disposal, off-site disposal, or treatment by Douglas Aircraft Company.

A.3 SAMPLE HANDLING

Samples collected during this investigation were treated as low concentration level samples for the purpose of shipping and handling. The following Sections provide the sample containers and preservation procedures and sample packing and shipment procedures.

BOE-C6-0091751

Sample Containers and Sample Preservation

The samples collected during this investigation were submitted for the analysis of chemical parameters identified in Section 3.0. Soil samples were collected in 4-inch brass sample tubes and preserved on ice immediately after collection and during shipment.

Groundwater samples were collected in 40-mil VOA vials and preserved on ice. Care will be taken to see that no air bubbles are present in each sample bottle. The VOA bottles were obtained from a State-certified laboratory.

Sample Packing and Shipment Procedures

Following the sampling, the exterior of all sample rings and bottles were initially decontaminated near the sampling location by wiping the outer surface with a moist cloth. The filled sample sleeves and bottles were not sprayed with water during decontamination as this water may compromise sample integrity. In preparation for shipment, all samples were packaged in accordance with the following procedures:

- Checked to make sure sleeve cap was securely tightened.
- Checked to make sure that the sample numbers were legible using waterproof ink, and that sample labels were securely attached to the sample containers. Placed each container in a Zip-loc bag or equivalent.
- Samples were placed in a cooler lined with two inches of vermiculite or equivalent non- combustible absorbent material. Additional space in the cooler was filled with additional packing material, ensuring that the samples were separated.
- Chain-of-custody forms were placed in a Zip-loc type bag and taped to the inside of cooler lid. A chain-of-custody form accompanied samples at all times.
- The cooler lid was closed and sealed with duct tape. The cooler drain port was sealed shut with tape.

BOE-C6-0091752

- All samples were transported to the laboratory as required for proper analysis within specified holding times. Samples were picked up by a messenger for delivery to the laboratory.

The field supervisor confirmed the sample shipment and any deviations from the original plan was noted in the field notebook.

A.4 SAMPLE DOCUMENTATION AND TRACKING

The following section provides the procedures which were followed for documenting field conditions, observations and other pertinent data.

Field Records

Field observations and other pertinent sampling information were recorded in the field and entries were made in a bound log book and/or on boring log sheets. The data recorded in the daily log book for each sample included the date, time (military time reference), sample number, sample appearance, and name of the person who collected the sample. In addition, general information was recorded in the field notebook, which included personnel present at the site, level of protection being worn at the time of sampling, and weather conditions. OVA readings obtained from safety monitoring of the breathing zone during sampling activities were also recorded in the field notebook to document sampling activities. For groundwater samples the temperature, pH, and conductivity were also recorded.

Field Chain-of-Custody Procedures

All samples were accompanied by a properly completed chain-of-custody form. The sample numbers and locations were listed on the form. When transferring possession of samples, the individuals relinquishing and receiving signed, dated, and noted the time on the chain-of-custody. This record documents the transfer of samples from the sampler to the permanent laboratory, or to/from a secured storage area.

BOE-C6-0091753

The original record accompanied the shipment, and additional copies were retained by the sampler to be returned to the project manager project files.

BOE-C6-0091754

APPENDIX B

BOE-C6-0091755

APPENDIX B

BORING LOGS AND SIEVE ANALYSIS

BOE-C6-0091756

BORING LOCATION	See Location Map			ELEVATION AND DATUM	Not Available
DRILLING AGENCY	A & R Drilling, Inc.	DRILLER	S. Koster	DATE STARTED 9/12/90	DATE FINISHED 9/13/90
DRILLING EQUIPMENT	CME 75 HT, with 11-inch-O.D. Hollow-Stem Auger			TOTAL DEPTH DRILLED (ft) 91.0	ROCK DEPTH (ft) –
TYPE OF WELL CASING	Schedule 40 PVC	SCREEN PERFORATION	0.010"	DIAMETER OF BORING (in.) 11	DIAMETER OF WELL (in.) 4
TYPE/SIZE OF SAND PACK	0/30 Monterey Sand	TYPE/THICKNESS OF SEAL(S)	Bentonite pellets (1/4") from 56' to 53'; bentonite cement grout from 53' to surface		
NUMBER OF SAMPLES	DISTURBED: 0	UNDISTURBED: 16	CORE: 0	LOGGED BY	H. Reyes
WATER DEPTH (ft)	FIRST: 69.1	COMPLETION: 68.7	24 HOURS: –	CHECKED BY	M. Razmdjoo

DEPTH, feet	DESCRIPTION	LITHOLOGIC LOG	WELL COMPLETION LOG	SAMPLES Number	Type	Blow Count	OVA (ppm) Head-space	OVA (ppm) Back-ground	DRILLING RATE (time)	REMARKS
	Damp, yellowish brown, SILTY fine-grained SAND (SM) [Fill?].								1028	
	Moist, olive brown, SANDY SILT (ML) [Fill?].									
5				1		4	44	21	1030	
	Soft, wet, black, SANDY CLAY (CL) [Fill?].									
	Very stiff, moist, yellowish brown, SILTY CLAY (CL).									
10				2		27	50	23	1039	
	Medium dense, moist, dark olive brown, SANDY SILT (ML), micaceous.									
15				3		10	34	23	1046	
20	Becomes loose, more SANDY.			4		8	42	23	1056	
	Becomes medium dense, more micaceous.									
25				5		12	33	30	1102	
30				6		13	39	30	1108	

Project: Douglas Aircraft
Project Number: 8941863J

LOG OF BORING WCC-11

Figure 1
1 of 3

3/11/92 2WELLG DAC60

Woodward-Clyde Consultants

DEPTH, feet	DESCRIPTION	LITHOLOGIC LOG	WELL COMPLETION LOG	SAMPLES Number	SAMPLES Type	SAMPLES Blow Count	OVA (ppm) Head-space	OVA (ppm) Back-ground	DRILLING RATE (time)	REMARKS
	Medium dense, moist, dark olive brown, SANDY SILT (ML), micaceous (continued).									
35				7		28	32	30	1118	
40	With some CLAY.			8		15	50	30	1140	
	Medium dense, moist, dark yellowish brown, fine- to medium-grained SAND (SP).									
45				9		21	50	30	1150	
50	Dense, very moist, olive brown, SILTY fine-grained SAND (SM).			10		36	61	31	1211	
	Lens of dense, moist, gray GRAVEL (GP), rounded, 1-inch size.									Slight rig chatter.
55	Very stiff, very moist, olive, CLAYEY SILT (MH), micaceous, with iron oxide staining.			11		26	62	31	1217	
	Dense, moist, olive brown, SILTY fine-grained SAND (SM).									
60	Becomes less SILTY, grading to SAND (SP).			12		33	43	30	1236	
	Becomes more SILTY, micaceous.									
65				13		50	52	30	1248.	
	Becomes wet, dark olive gray, fine-grained SAND with SILT (SP-SM), very micaceous.									
70				14		44	56	31	1257	

Project: Douglas Aircraft
Project Number: 8941863J

LOG OF BORING WCC-11

Figure 1
2 of 3

3/11/92 2WLOG DAGCO

Woodward-Clyde Consultants

DEPTH, feet	DESCRIPTION	LITHOLOGIC LOG	WELL COMPLETION LOG	SAMPLES Number	SAMPLES Type	SAMPLES Blow Count	OVA (ppm) Head-space	OVA (ppm) Back-ground	DRILLING RATE (time)	REMARKS
	Dense, wet, dark olive gray , fine-grained SAND with SILT (SP-SM), very micaceous (continued).									
75	Dense, wet, olive, SANDY SILT (ML), thinly bedded.			15		46	62	60	1311	
	Very dense, wet, olive brown, fine- to medium-grained SAND with SILT (SP-SM).									
80				16		57	43	30	1329	
85										10' of surging sand inside auger prevented sampling.
90										12' of surging sand inside auger prevented sampling.
	Bottom of boring at 91 feet.									
95										
100										
105										

Project: Douglas Aircraft
Project Number: 8941863J

LOG OF BORING WCC-11

Figure 1
3 of 3

3/11/92 2WLOG DACCO

Woodward-Clyde Consultants

BORING LOCATION	See Location Map	ELEVATION AND DATUM	Not Available
DRILLING AGENCY	A & R Drilling, Inc.	DRILLER S. Koster	DATE STARTED 9/17/90 — DATE FINISHED 9/17/90
DRILLING EQUIPMENT	CME 75 HT, with 11-inch-O.D. Hollow-Stem Auger	TOTAL DEPTH DRILLED (ft) 91.5	ROCK DEPTH (ft) –
TYPE OF WELL CASING	Schedule 40 PVC	SCREEN PERFORATION 0.010"	DIAMETER OF BORING (in.) 11 — DIAMETER OF WELL (in.) 4
TYPE/SIZE OF SAND PACK	0/30 Monterey Sand	TYPE/THICKNESS OF SEAL(S)	Bentonite pellets (3/8") from 55' to 52.5'; bentonite cement grout from 52.5' to surface
NUMBER OF SAMPLES	DISTURBED: 0	UNDISTURBED: 18	CORE: 0 — LOGGED BY H. Reyes
WATER DEPTH (ft)	FIRST: 69.4	COMPLETION: 66.5	24 HOURS: – — CHECKED BY M. Razmdjoo

DEPTH, feet	DESCRIPTION	LITHOLOGIC LOG	WELL COMPLETION LOG	SAMPLES Number	SAMPLES Type	SAMPLES Blow Count	OVA (ppm) Head-space	OVA (ppm) Back-ground	DRILLING RATE (time)	REMARKS
	← 6 inches asphalt concrete.								0845	
	Moist, dark yellowish brown, SANDY CLAY, with fine GRAVEL [Fill].									
	Medium dense, moist, dark yellowish brown, SILTY fine-grained SAND (SM).									
5				1		24	22	8	0852	
	With trace CLAY.									
10				2		15	28	8	0859	
	Medium dense, moist, olive brown, SANDY SILT (ML) to SILTY SAND (SM).									
15				3		18	34	9	0908	
20	Becomes moist to very moist.			4		25	34	9	0915	
	Very stiff, moist, olive brown, SANDY CLAY (CL).									
25				5		23	30	9	0923	
	Dense, moist, olive brown, fine-grained SAND with SILT (SP-SM).									
30				6		34	36	10	0935	

Project: Douglas Aircraft
Project Number: 8941863J

LOG OF BORING WCC-12

Figure 2
1 of 3

3/11/92 2WLOG DACCO

Woodward-Clyde Consultants

DEPTH, feet	DESCRIPTION	LITHOLOGIC LOG	WELL COMPLETION LOG	SAMPLES Number	SAMPLES Type	SAMPLES Blow Count	OVA (ppm) Head-space	OVA (ppm) Back-ground	DRILLING RATE (time)	REMARKS
	Dense, moist, olive brown, fine-grained SAND with SILT (SP-SM) (continued).									
35	Medium dense, moist, olive brown, SANDY SILT (ML), with trace CLAY.			7		24	38	12	0946	
40	Dense, moist, yellowish brown, medium-grained SAND (SP).			8		35	37	10	0955	
45	Medium dense, moist, yellowish brown, SILTY fine-grained SAND (SM), with abundant shells.			9		27	38	10	1003	
50	Very stiff, very moist, mottled (olive and yellowish brown), CLAYEY SILT (MH) to SILTY CLAY (CL), with iron oxide veinlets.			10		24	44	10	1013	
55	Medium dense, moist to very moist, olive, SILTY fine-grained SAND (SM).			11		24	44	10	1024	
60				12		42	42	12	1036	
	Dense, moist, olive brown, SANDY SILT (ML), with some iron oxide veinlets.									
65	Dense, wet, olive, SILTY fine-grained SAND (SM).			13		45	46	12	1051	
70				14		34	48	12	1109	Water was noticed at approximately 69.4 feet.

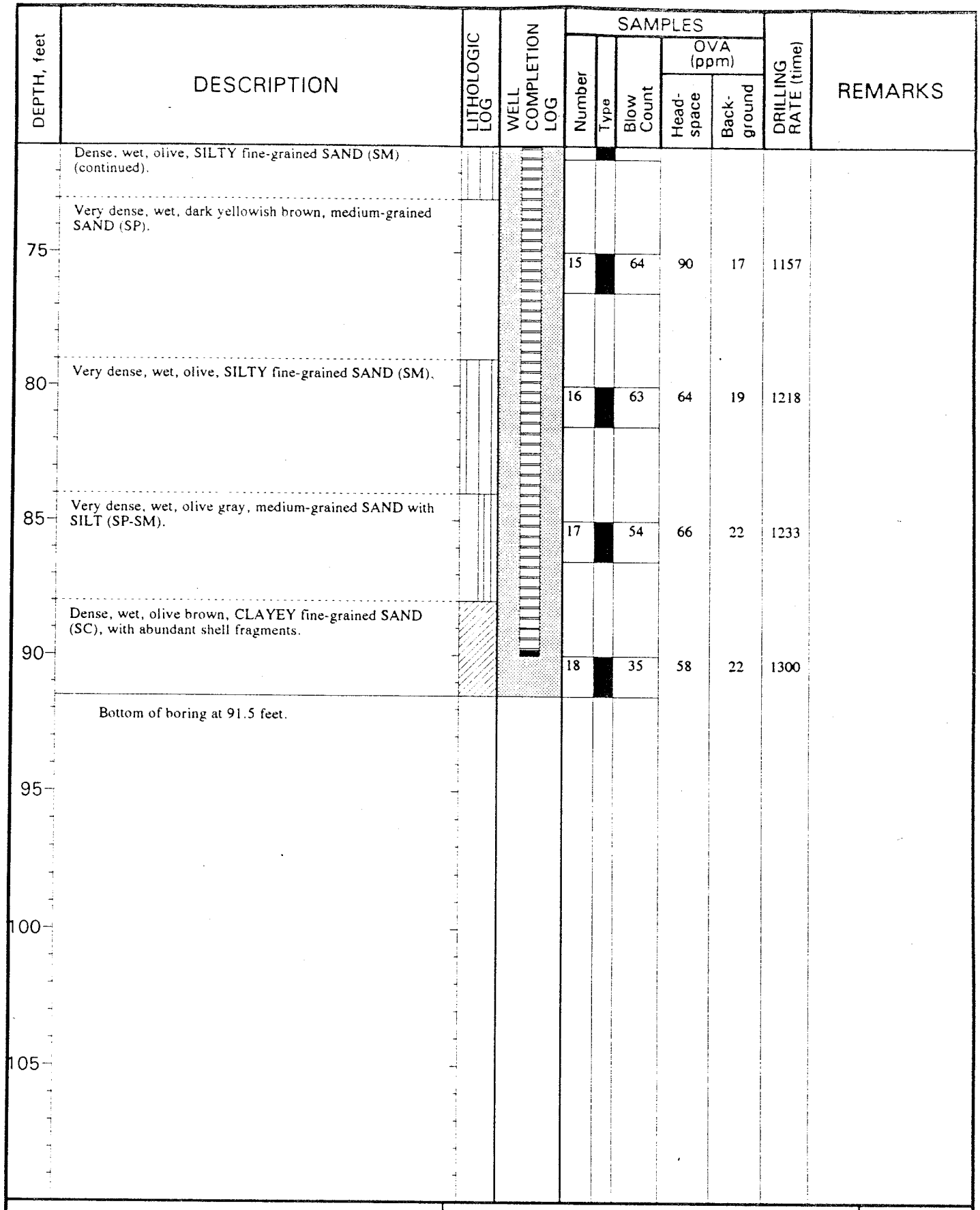
Project: Douglas Aircraft
Project Number: 8941863J

LOG OF BORING WCC-12

Figure 2
2 of 3

3/11/92 2WLOG 0ACCO

Woodward-Clyde Consultants



Project: Douglas Aircraft
Project Number: 8941863J

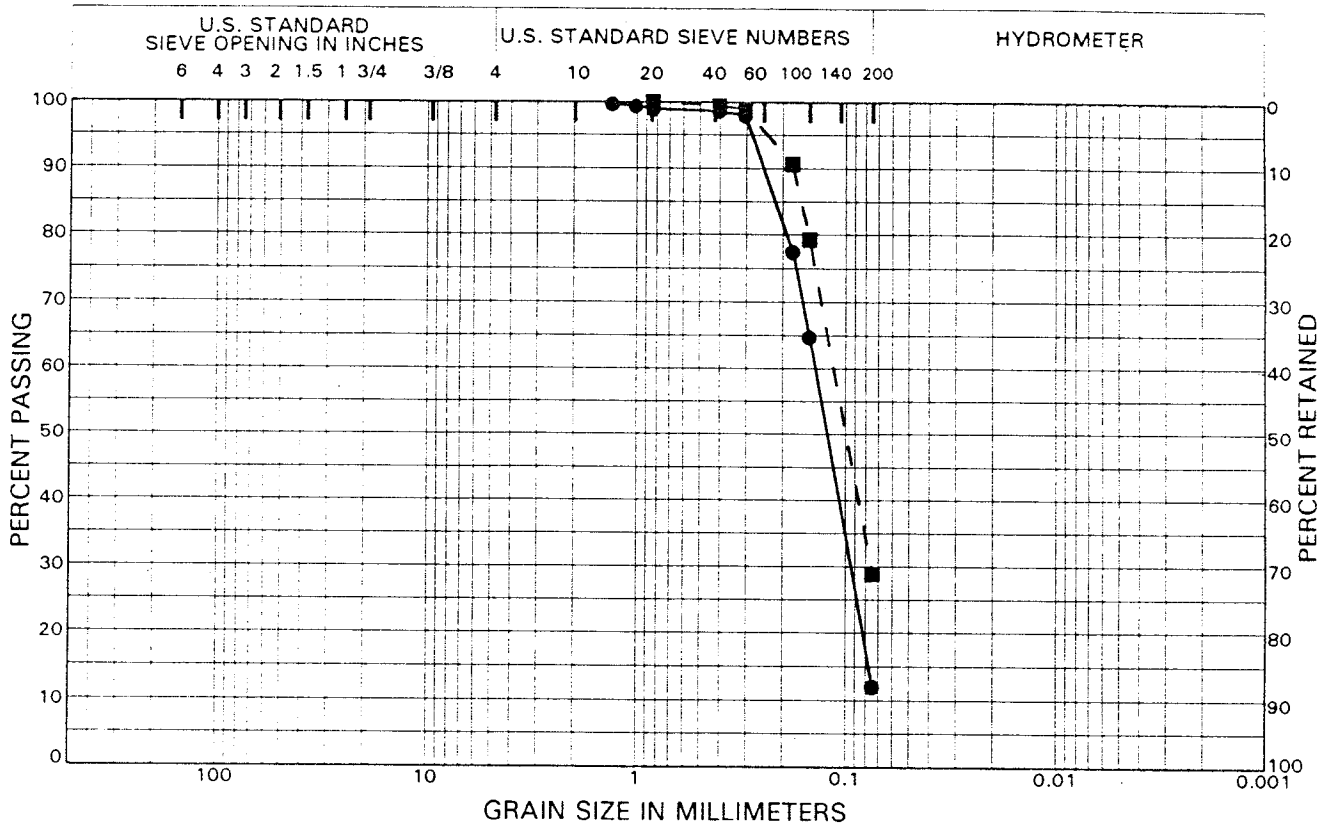
LOG OF BORING WCC-12

Figure 2
3 of 3

3-11-92 2WLOG DACCO

Woodward-Clyde Consultants

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	



Sample Number	Depth (feet)	Symbol	LL	PI	Classification
WCC-11		●			Poorly Graded Sand with Silt (SP-SM)
WCC-12		■			Silty Sand (SM)

Project: Douglas Aircraft
Project Number: 8941863J

GRAIN SIZE DISTRIBUTION CURVES

Figure 3

3/11/92 2SIEVE DAGCO

Woodward-Clyde Consultants

BOE-C6-0091764

APPENDIX C

ANALYTICAL RESULTS AND CHAIN-OF-CUSTODY FORMS

BOE-C6-0091765

October 12, 1990

RECEIVED
OCT 16 1990
WCC-SANTA ANA

WOODWARD-CLYDE CONSULTANTS
203 N. Golden Circle Dr.
Santa Ana, CA 92705

Attn: Dr. Alistaire Callender

JOB NO. 16763

WEST COAST ANALYTICAL SERVICE, INC.
ANALYTICAL CHEMISTS

A

LABORATORY REPORT

Samples Received: Two (2) waters in quintuplet and one (1) trip blank
Date Received: 10-4-90
Date Released for Analysis: 10-9-90
Purchase Order No: Proj#: 8941863J/Douglas Aircraft

The samples were analyzed as follows:

Samples Analyzed	Analysis	Results
Four (4) waters	Volatile Organics by EPA 624	Data Sheets
Four (4) waters	Surrogate Percent Recoveries for EPA 624	Data Sheet

B. Michael Hovanec
Senior Staff Chemist

D. J. Northington, Ph.D.
President

9840 Alburtis Avenue • Santa Fe Springs, California 90670 • 213/948-2225 • FAX 213/948-5850

BOE-C6-0091766

CLIENT: WOODWARD CLYDE CONSULTANTS SAMPLE: TRIP BLANK
WCAS JOB #: 16763

DATE RECEIVED: 10/04/90 RUN NUMBER: 16763V1
DATE EXTRACTED: 10/10/90 SAMPLE AMOUNT: 5ML
DATE ANALYZED: 10/10/90 MATRIX: WATER

VOLATILE ORGANICS (EPA 624/8240) UNITS: UG/L (PPB)

CAS #	COMPOUND	CONCENTRATION	DET LIMIT
67-64-1	ACETONE	7.	5.
71-43-2	BENZENE	ND	1.
75-27-2	BROMODICHLOROMETHANE	ND	1.
75-25-2	BROMOFORM	ND	1.
74-83-9	BROMOMETHANE	ND	5.
78-93-3	2-BUTANONE (MEK)	ND	5.
75-15-0	CARBON DISULFIDE	ND	1.
56-23-5	CARBON TETRACHLORIDE	ND	1.
108-90-7	CHLOROBENZENE	ND	1.
75-00-3	CHLOROETHANE	ND	5.
110-75-8	2-CHLOROETHYLVINYL ETHER	ND	10.
67-66-3	CHLOROFORM	ND	1.
74-87-3	CHLOROMETHANE	ND	5.
108-41-8	CHLOROTOLUENE	ND	1.
124-48-1	DIBROMOCHLOROMETHANE	ND	1.
95-50-1	1,2-DICHLOROBENZENE	ND	1.
541-73-1	1,3-DICHLOROBENZENE	ND	1.
106-46-7	1,4-DICHLOROBENZENE	ND	1.
75-34-3	1,1-DICHLOROETHANE	ND	1.
107-06-2	1,2-DICHLOROETHANE	ND	1.
75-35-4	1,1-DICHLOROETHYLENE	ND	1.
156-59-4	CIS-1,2-DICHLOROETHYLENE	ND	1.
156-60-5	TRANS-1,2-DICHLOROETHYLENE	ND	1.
78-87-5	1,2-DICHLOROPROPANE	ND	1.
10061-01-5	CIS-1,3-DICHLOROPROPENE	ND	1.
10061-02-6	TRANS-1,3-DICHLOROPROPENE	ND	1.
100-41-4	ETHYLBENZENE	ND	1.
106-93-4	ETHYLENE DIBROMIDE	ND	1.
76-13-1	FREON-TF	ND	1.
119-78-6	2-HEXANONE	ND	5.
75-09-2	METHYLENE CHLORIDE	ND	5.
108-10-1	4-METHYL-2-PENTANONE (MIBK)	ND	5.
100-42-5	STYRENE	ND	1.
79-34-5	1,1,2,2-TETRACHLOROETHANE	ND	1.
127-18-4	TETRACHLOROETHYLENE	ND	1.
109-99-9	TETRAHYDROFURAN	ND	5.
108-88-3	TOLUENE	ND	1.
71-55-6	1,1,1-TRICHLOROETHANE	ND	1.
79-00-5	1,1,2-TRICHLOROETHANE	ND	1.
79-01-6	TRICHLOROETHYLENE	ND	1.
75-69-4	TRICHLOROFLUOROMETHANE	ND	1.
108-05-4	VINYL ACETATE	ND	5.
75-01-4	VINYL CHLORIDE	ND	5.
95-47-6	TOTAL XYLENES	ND	1.

TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT: WOODWARD CLYDE CONSULTANTS SAMPLE: TRIP BLANK
WCAS JOB #: 16763

UNITS: UG/L (PPB)

	COMPOUND NAME	FRACTION	APPROXIMATE CONCENTRATION
1	NONE FOUND	VOA	

BOE-C6-0091768

CLIENT: WOODWARD CLYDE CONSULTANTS SAMPLE: WCC-11S-1B
WCAS JOB #: 16763

DATE RECEIVED: 10/04/90 RUN NUMBER: 16763V2
DATE EXTRACTED: 10/10/90 SAMPLE AMOUNT: 5ML
DATE ANALYZED: 10/10/90 MATRIX: WATER

VOLATILE ORGANICS (EPA 624/8240) UNITS: UG/L (PPB)

CAS #	COMPOUND	CONCENTRATION	DET LIMIT
67-64-1	ACETONE	ND	5.
71-43-2	BENZENE	ND	1.
75-27-2	BROMODICHLOROMETHANE	ND	1.
75-25-2	BROMOFORM	ND	1.
74-83-9	BROMOMETHANE	ND	5.
78-93-3	2-BUTANONE (MEK)	ND	5.
75-15-0	CARBON DISULFIDE	ND	1.
56-23-5	CARBON TETRACHLORIDE	ND	1.
108-90-7	CHLOROBENZENE	ND	1.
75-00-3	CHLOROETHANE	ND	5.
110-75-8	2-CHLOROETHYLVINYL ETHER	ND	10.
67-66-3	CHLOROFORM	ND	1.
74-87-3	CHLOROMETHANE	ND	5.
108-41-8	CHLOROTOLUENE	ND	1.
124-48-1	DIBROMOCHLOROMETHANE	ND	1.
95-50-1	1,2-DICHLOROBENZENE	ND	1.
541-73-1	1,3-DICHLOROBENZENE	ND	1.
106-46-7	1,4-DICHLOROBENZENE	ND	1.
75-34-3	1,1-DICHLOROETHANE	ND	1.
107-06-2	1,2-DICHLOROETHANE	ND	1.
75-35-4	1,1-DICHLOROETHYLENE	3.	1.
156-59-4	CIS-1,2-DICHLOROETHYLENE	1.	1.
156-60-5	TRANS-1,2-DICHLOROETHYLENE	ND	1.
78-87-5	1,2-DICHLOROPROPANE	ND	1.
10061-01-5	CIS-1,3-DICHLOROPROPENE	ND	1.
10061-02-6	TRANS-1,3-DICHLOROPROPENE	ND	1.
100-41-4	ETHYLBENZENE	ND	1.
106-93-4	ETHYLENE DIBROMIDE	ND	1.
76-13-1	FREON-TF	ND	1.
119-78-6	2-HEXANONE	ND	5.
75-09-2	METHYLENE CHLORIDE	ND	5.
108-10-1	4-METHYL-2-PENTANONE (MIBK)	ND	5.
100-42-5	STYRENE	ND	1.
79-34-5	1,1,2,2-TETRACHLOROETHANE	ND	1.
127-18-4	TETRACHLOROETHYLENE	ND	1.
109-99-9	TETRAHYDROFURAN	ND	5.
108-88-3	TOLUENE	ND	1.
71-55-6	1,1,1-TRICHLOROETHANE	ND	1.
79-00-5	1,1,2-TRICHLOROETHANE	ND	1.
79-01-6	TRICHLOROETHYLENE	21.	1.
75-69-4	TRICHLOROFLUOROMETHANE	ND	1.
108-05-4	VINYL ACETATE	ND	5.
75-01-4	VINYL CHLORIDE	ND	5.
95-47-6	TOTAL XYLENES	ND	1.

TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT: WOODWARD CLYDE CONSULTANTS SAMPLE: WCC-11S-1B
WCAS JOB #: 16763

UNITS: UG/L (PPB)

	COMPOUND NAME	FRACTION	APPROXIMATE CONCENTRATION
1	NONE FOUND	VOA	

BOE-C6-0091770

CLIENT: WOODWARD CLYDE CONSULTANTS SAMPLE: WCC-12S-1B
WCAS JOB #: 16763

DATE RECEIVED: 10/04/90 RUN NUMBER: 16763V3
DATE EXTRACTED: 10/10/90 SAMPLE AMOUNT: 5ML
DATE ANALYZED: 10/10/90 MATRIX: WATER

VOLATILE ORGANICS (EPA 624/8240) UNITS: UG/L (PPB)

CAS #	COMPOUND	CONCENTRATION	DET LIMIT
67-64-1	ACETONE	ND	5.
71-43-2	BENZENE	5.	1.
75-27-2	BROMODICHLOROMETHANE	ND	1.
75-25-2	BROMOFORM	ND	1.
74-83-9	BROMOMETHANE	ND	5.
78-93-3	2-BUTANONE (MEK)	ND	5.
75-15-0	CARBON DISULFIDE	ND	1.
56-23-5	CARBON TETRACHLORIDE	ND	1.
108-90-7	CHLOROBENZENE	ND	1.
75-00-3	CHLOROETHANE	ND	5.
110-75-8	2-CHLOROETHYLVINYL ETHER	ND	10.
67-66-3	CHLOROFORM	8.	1.
74-87-3	CHLOROMETHANE	ND	5.
108-41-8	CHLOROTOLUENE	ND	1.
124-48-1	DIBROMOCHLOROMETHANE	ND	1.
95-50-1	1,2-DICHLOROBENZENE	ND	1.
541-73-1	1,3-DICHLOROBENZENE	ND	1.
106-46-7	1,4-DICHLOROBENZENE	ND	1.
75-34-3	1,1-DICHLOROETHANE	15.	1.
107-06-2	1,2-DICHLOROETHANE	3.	1.
75-35-4	1,1-DICHLOROETHYLENE	1100.	1.
156-59-4	CIS-1,2-DICHLOROETHYLENE	36.	1.
156-60-5	TRANS-1,2-DICHLOROETHYLENE	15.	1.
78-87-5	1,2-DICHLOROPROPANE	ND	1.
10061-01-5	CIS-1,3-DICHLOROPROPENE	ND	1.
10061-02-6	TRANS-1,3-DICHLOROPROPENE	ND	1.
100-41-4	ETHYLBENZENE	ND	1.
106-93-4	ETHYLENE DIBROMIDE	ND	1.
76-13-1	FREON-TF	ND	1.
119-78-6	2-HEXANONE	ND	5.
75-09-2	METHYLENE CHLORIDE	ND	5.
108-10-1	4-METHYL-2-PENTANONE (MIBK)	ND	5.
100-42-5	STYRENE	ND	1.
79-34-5	1,1,2,2-TETRACHLOROETHANE	ND	1.
127-18-4	TETRACHLOROETHYLENE	ND	1.
109-99-9	TETRAHYDROFURAN	ND	5.
108-88-3	TOLUENE	ND	1.
71-55-6	1,1,1-TRICHLOROETHANE	86.	1.
79-00-5	1,1,2-TRICHLOROETHANE	4.	1.
79-01-6	TRICHLOROETHYLENE	1700.	1.
75-69-4	TRICHLOROFLUOROMETHANE	ND	1.
108-05-4	VINYL ACETATE	ND	5.
75-01-4	VINYL CHLORIDE	ND	5.
95-47-6	TOTAL XYLENES	ND	1.

TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT: WOODWARD CLYDE CONSULTANTS SAMPLE: WCC-12S-1B
WCAS JOB #: 16763

UNITS: UG/L (PPB)

	COMPOUND NAME	FRACTION	APPROXIMATE CONCENTRATION
1	NONE FOUND	VOA	

CLIENT: WOODWARD CLYDE CONSULTANTS SAMPLE: WCC-12S-1C
WCAS JOB #: 16763

DATE RECEIVED: 10/04/90 RUN NUMBER: 16763V4
DATE EXTRACTED: 10/10/90 SAMPLE AMOUNT: 5ML
DATE ANALYZED: 10/10/90 MATRIX: WATER

VOLATILE ORGANICS (EPA 624/8240) UNITS: UG/L (PPB)

CAS #	COMPOUND	CONCENTRATION	DET LIMIT
67-64-1	ACETONE	ND	5.
71-43-2	BENZENE	4.	1.
75-27-2	BROMODICHLOROMETHANE	ND	1.
75-25-2	BROMOFORM	ND	1.
74-83-9	BROMOMETHANE	ND	5.
78-93-3	2-BUTANONE (MEK)	ND	5.
75-15-0	CARBON DISULFIDE	ND	1.
56-23-5	CARBON TETRACHLORIDE	ND	1.
108-90-7	CHLOROBENZENE	ND	1.
75-00-3	CHLOROETHANE	ND	5.
110-75-8	2-CHLOROETHYLVINYL ETHER	ND	10.
67-66-3	CHLOROFORM	7.	1.
74-87-3	CHLOROMETHANE	ND	5.
108-41-8	CHLOROTOLUENE	ND	1.
124-48-1	DIBROMOCHLOROMETHANE	ND	1.
95-50-1	1,2-DICHLOROBENZENE	ND	1.
541-73-1	1,3-DICHLOROBENZENE	ND	1.
106-46-7	1,4-DICHLOROBENZENE	ND	1.
75-34-3	1,1-DICHLOROETHANE	12.	1.
107-06-2	1,2-DICHLOROETHANE	3.	1.
75-35-4	1,1-DICHLOROETHYLENE	930.	1.
156-59-4	CIS-1,2-DICHLOROETHYLENE	31.	1.
156-60-5	TRANS-1,2-DICHLOROETHYLENE	13.	1.
78-87-5	1,2-DICHLOROPROPANE	ND	1.
10061-01-5	CIS-1,3-DICHLOROPROPENE	ND	1.
10061-02-6	TRANS-1,3-DICHLOROPROPENE	ND	1.
100-41-4	ETHYLBENZENE	ND	1.
106-93-4	ETHYLENE DIBROMIDE	ND	1.
76-13-1	FREON-TF	ND	1.
119-78-6	2-HEXANONE	ND	5.
75-09-2	METHYLENE CHLORIDE	ND	5.
108-10-1	4-METHYL-2-PENTANONE (MIBK)	ND	5.
100-42-5	STYRENE	ND	1.
79-34-5	1,1,2,2-TETRACHLOROETHANE	ND	1.
127-18-4	TETRACHLOROETHYLENE	ND	1.
109-99-9	TETRAHYDROFURAN	ND	5.
108-88-3	TOLUENE	ND	1.
71-55-6	1,1,1-TRICHLOROETHANE	73.	1.
79-00-5	1,1,2-TRICHLOROETHANE	4.	1.
79-01-6	TRICHLOROETHYLENE	1500.	1.
75-69-4	TRICHLOROFLUOROMETHANE	ND	1.
108-05-4	VINYL ACETATE	ND	5.
75-01-4	VINYL CHLORIDE	ND	5.
95-47-6	TOTAL XYLENES	ND	1.

TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT: WOODWARD CLYDE CONSULTANTS SAMPLE: WCC-12S-1C
WCAS JOB #: 16763

UNITS: UG/L (PPB)

	COMPOUND NAME	FRACTION	APPROXIMATE CONCENTRATION
1	NONE FOUND	VOA	

BOE-C6-0091774

CLIENT: WOODWARD CLYDE CONSULTANTS SAMPLE: LAB BLANK
WCAS JOB #: 16763

DATE RECEIVED: 10/04/90 RUN NUMBER: VBLK571
DATE EXTRACTED: 10/10/90 SAMPLE AMOUNT: 5ML
DATE ANALYZED: 10/10/90 MATRIX: WATER

VOLATILE ORGANICS (EPA 624/8240) UNITS: UG/L (PPB)

CAS #	COMPOUND	CONCENTRATION	DET LIMIT
67-64-1	ACETONE	ND	5.
71-43-2	BENZENE	ND	1.
75-27-2	BROMODICHLOROMETHANE	ND	1.
75-25-2	BROMOFORM	ND	1.
74-83-9	BROMOMETHANE	ND	5.
78-93-3	2-BUTANONE (MEK)	ND	5.
75-15-0	CARBON DISULFIDE	ND	1.
56-23-5	CARBON TETRACHLORIDE	ND	1.
108-90-7	CHLOROBENZENE	ND	1.
75-00-3	CHLOROETHANE	ND	5.
110-75-8	2-CHLOROETHYLVINYL ETHER	ND	10.
67-66-3	CHLOROFORM	ND	1.
74-87-3	CHLOROMETHANE	ND	5.
108-41-8	CHLOROTOLUENE	ND	1.
124-48-1	DIBROMOCHLOROMETHANE	ND	1.
95-50-1	1,2-DICHLOROBENZENE	ND	1.
541-73-1	1,3-DICHLOROBENZENE	ND	1.
106-46-7	1,4-DICHLOROBENZENE	ND	1.
75-34-3	1,1-DICHLOROETHANE	ND	1.
107-06-2	1,2-DICHLOROETHANE	ND	1.
75-35-4	1,1-DICHLOROETHYLENE	ND	1.
156-59-4	CIS-1,2-DICHLOROETHYLENE	ND	1.
156-60-5	TRANS-1,2-DICHLOROETHYLENE	ND	1.
78-87-5	1,2-DICHLOROPROPANE	ND	1.
10061-01-5	CIS-1,3-DICHLOROPROPENE	ND	1.
10061-02-6	TRANS-1,3-DICHLOROPROPENE	ND	1.
100-41-4	ETHYLBENZENE	ND	1.
106-93-4	ETHYLENE DIBROMIDE	ND	1.
76-13-1	FREON-TF	ND	1.
119-78-6	2-HEXANONE	ND	5.
75-09-2	METHYLENE CHLORIDE	ND	5.
108-10-1	4-METHYL-2-PENTANONE (MIBK)	ND	5.
100-42-5	STYRENE	ND	1.
79-34-5	1,1,2,2-TETRACHLOROETHANE	ND	1.
127-18-4	TETRACHLOROETHYLENE	ND	1.
109-99-9	TETRAHYDROFURAN	ND	5.
108-88-3	TOLUENE	ND	1.
71-55-6	1,1,1-TRICHLOROETHANE	ND	1.
79-00-5	1,1,2-TRICHLOROETHANE	ND	1.
79-01-6	TRICHLOROETHYLENE	ND	1.
75-69-4	TRICHLOROFLUOROMETHANE	ND	1.
108-05-4	VINYL ACETATE	ND	5.
75-01-4	VINYL CHLORIDE	ND	5.
95-47-6	TOTAL XYLENES	ND	1.

TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT: WOODWARD CLYDE CONSULTANTS SAMPLE: LAB BLANK
WCAS JOB #: 16763

UNITS: UG/L (PPB)

	COMPOUND NAME	FRACTION	APPROXIMATE CONCENTRATION
1	NONE FOUND	VOA	

BOE-C6-0091776

CLIENT: WOODWARD CLYDE CONSULTANTS SAMPLE: LAB BLANK
WCAS JOB #: 16763

DATE RECEIVED: 10/04/90 RUN NUMBER: VBLK572
DATE EXTRACTED: 10/11/90 SAMPLE AMOUNT: 5ML
DATE ANALYZED: 10/11/90 MATRIX: WATER

VOLATILE ORGANICS (EPA 624/8240) UNITS: UG/L (PPB)

CAS #	COMPOUND	CONCENTRATION	DET LIMIT
67-64-1	ACETONE	ND	5.
71-43-2	BENZENE	ND	1.
75-27-2	BROMODICHLOROMETHANE	ND	1.
75-25-2	BROMOFORM	ND	1.
74-83-9	BROMOMETHANE	ND	5.
78-93-3	2-BUTANONE (MEK)	ND	5.
75-15-0	CARBON DISULFIDE	ND	1.
56-23-5	CARBON TETRACHLORIDE	ND	1.
108-90-7	CHLOROBENZENE	ND	1.
75-00-3	CHLOROETHANE	ND	5.
110-75-8	2-CHLOROETHYLVINYL ETHER	ND	10.
67-66-3	CHLOROFORM	ND	1.
74-87-3	CHLOROMETHANE	ND	5.
108-41-8	CHLOROTOLUENE	ND	1.
124-48-1	DIBROMOCHLOROMETHANE	ND	1.
95-50-1	1,2-DICHLOROBENZENE	ND	1.
541-73-1	1,3-DICHLOROBENZENE	ND	1.
106-46-7	1,4-DICHLOROBENZENE	ND	1.
75-34-3	1,1-DICHLOROETHANE	ND	1.
107-06-2	1,2-DICHLOROETHANE	ND	1.
75-35-4	1,1-DICHLOROETHYLENE	ND	1.
156-59-4	CIS-1,2-DICHLOROETHYLENE	ND	1.
156-60-5	TRANS-1,2-DICHLOROETHYLENE	ND	1.
78-87-5	1,2-DICHLOROPROPANE	ND	1.
10061-01-5	CIS-1,3-DICHLOROPROPENE	ND	1.
10061-02-6	TRANS-1,3-DICHLOROPROPENE	ND	1.
100-41-4	ETHYLBENZENE	ND	1.
106-93-4	ETHYLENE DIBROMIDE	ND	1.
76-13-1	FREON-TF	ND	1.
119-78-6	2-HEXANONE	ND	5.
75-09-2	METHYLENE CHLORIDE	ND	5.
108-10-1	4-METHYL-2-PENTANONE (MIBK)	ND	5.
100-42-5	STYRENE	ND	1.
79-34-5	1,1,2,2-TETRACHLOROETHANE	ND	1.
127-18-4	TETRACHLOROETHYLENE	ND	1.
109-99-9	TETRAHYDROFURAN	ND	5.
108-88-3	TOLUENE	ND	1.
71-55-6	1,1,1-TRICHLOROETHANE	ND	1.
79-00-5	1,1,2-TRICHLOROETHANE	ND	1.
79-01-6	TRICHLOROETHYLENE	ND	1.
75-69-4	TRICHLOROFLUOROMETHANE	ND	1.
108-05-4	VINYL ACETATE	ND	5.
75-01-4	VINYL CHLORIDE	ND	5.
95-47-6	TOTAL XYLENES	ND	1.

TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT: WOODWARD CLYDE CONSULTANTS SAMPLE: LAB BLANK
WCAS JOB #: 16763

UNITS: UG/L (PPB)

	COMPOUND NAME	FRACTION	APPROXIMATE CONCENTRATION
1	NONE FOUND	VOA	

BOE-C6-0091778

VOLATILE SURROGATE PERCENT RECOVERY SUMMARY

INSTRUMENT : TRIO1
DATE ANALYZED: 10/10/90

FILENAME	SAMPLE ID	W/S	1,2-DICHLORO-ETHANE-d4	TOLUENE-d8	BFB
16763V1	TRIP BLANK	W	108	89	91
16763V2	WCC-11S-1B	W	109	90	89
16763V3	WCC-12S-1B	W	110	90	91
16763V4	WCC-12S-1C	W	109	90	93
VBLK571	LAB BLANK	W	108	96	96

S - SOIL W - WATER

INSTRUMENT : TRIO1
DATE ANALYZED: 10/11/90

FILENAME	SAMPLE ID	W/S	1,2-DICHLORO-ETHANE-d4	TOLUENE-d8	BFB
16763V5	WCC-12S-1B	W	111	96	96
16763V6	WCC-12S-1C	W	111	97	96
VBLK572	LAB BLANK	W	111	95	95

S - SOIL W - WATER

Data Reporting Qualifiers

Value - If the result is a value greater than or equal to the Detection Limit (DL), the value is reported.

ND - Indicates that the compound was analyzed for but not detected. The minimum DL for the sample with the ND is reported based on necessary concentration or dilution actions.

TR - Indicates an estimated value. This flag is used when the mass spectral data indicates the presence of a compound that meets the identification criteria but the result is less than the specified DL but greater than zero.

September 25, 1990

RECEIVED
SEP 26 1990
WCC-SANTA ANA

WEST COAST ANALYTICAL SERVICE, INC.
ANALYTICAL CHEMISTS

WOODWARD-CLYDE CONSULTANTS
203 N. Golden Circle Dr.
Santa Ana, CA 92705

Attn: Dr. Alistaire Callender

JOB NO. 16636

A

LABORATORY REPORT

Samples Received: Thirty-four (34) Soil Samples
Date Received: 9-17-90
Date Released for Analysis: 9-21-90
Purchase Order No: Proj#: 8941863J Task II/Douglas Aircraft

The samples were analyzed as follows:

Samples Analyzed	Analysis	Results
Three (3) soils	Volatile Organics by EPA 8240	Data Sheets

B. Michael Hovanec
Senior Staff Chemist

D. J. Northington, Ph.D.
President

9840 Alburtis Avenue • Santa Fe Springs, California 90670 • 213/948-2225 • FAX 213/948-5850

BOE-C6-0091781

CLIENT: WOODWARD CLYDE CONSULTANTS SAMPLE: WCC-11-14-3
WCAS JOB #: 16636

DATE RECEIVED: 09/17/90 RUN NUMBER: 16636V3
DATE EXTRACTED: 09/24/90 SAMPLE AMOUNT: 1.0G
DATE ANALYZED: 09/24/90 MATRIX: SOIL

VOLATILE ORGANICS (EPA 624/8240) UNITS: UG/KG (PPB)

CAS #	COMPOUND	CONCENTRATION	DET LIMIT
67-64-1	ACETONE	ND	30.
71-43-2	BENZENE	ND	5.
75-27-4	BROMODICHLOROMETHANE	ND	5.
75-25-2	BROMOFORM	ND	5.
74-83-9	BROMOMETHANE	ND	30.
78-93-3	2-BUTANONE (MEK)	ND	30.
75-15-0	CARBON DISULFIDE	ND	5.
56-23-5	CARBON TETRACHLORIDE	ND	5.
108-90-7	CHLOROBENZENE	ND	5.
75-00-3	CHLOROETHANE	ND	30.
110-75-8	2-CHLOROETHYLVINYL ETHER	ND	50.
67-66-3	CHLOROFORM	ND	5.
74-87-3	CHLOROMETHANE	ND	30.
108-41-8	CHLOROTOLUENE	ND	5.
124-48-1	DIBROMOCHLOROMETHANE	ND	5.
95-50-1	1,2-DICHLOROBENZENE	ND	5.
541-73-1	1,3-DICHLOROBENZENE	ND	5.
106-46-7	1,4-DICHLOROBENZENE	ND	5.
75-34-3	1,1-DICHLOROETHANE	ND	5.
107-06-2	1,2-DICHLOROETHANE	ND	5.
75-35-4	1,1-DICHLOROETHYLENE	ND	5.
156-59-4	CIS-1,2-DICHLOROETHYLENE	ND	5.
156-60-5	TRANS-1,2-DICHLOROETHYLENE	ND	5.
78-87-5	1,2-DICHLOROPROPANE	ND	5.
10061-01-5	CIS-1,3-DICHLOROPROPENE	ND	5.
10061-02-6	TRANS-1,3-DICHLOROPROPENE	ND	5.
100-41-4	ETHYLBENZENE	ND	5.
106-93-4	ETHYLENE DIBROMIDE	ND	5.
76-13-1	FREON-TF	ND	5.
119-78-6	2-HEXANONE	ND	30.
75-09-2	METHYLENE CHLORIDE	ND	30.
108-10-1	4-METHYL-2-PENTANONE (MIBK)	ND	30.
100-42-5	STYRENE	ND	5.
79-34-5	1,1,2,2-TETRACHLOROETHANE	ND	5.
127-18-4	TETRACHLOROETHYLENE	ND	5.
109-99-9	TETRAHYDROFURAN	ND	30.
108-88-3	TOLUENE	ND	5.
71-55-6	1,1,1-TRICHLOROETHANE	ND	5.
79-00-5	1,1,2-TRICHLOROETHANE	ND	5.
79-01-6	TRICHLOROETHYLENE	9.	5.
75-69-4	TRICHLOROFLUOROMETHANE	ND	5.
108-05-4	VINYL ACETATE	ND	30.
75-01-4	VINYL CHLORIDE	ND	30.
95-47-6	TOTAL XYLENES	ND	5.

TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT: WOODWARD CLYDE CONSULTANTS SAMPLE: WCC-11-14-3
WCAS JOB #: 16636

UNITS: UG/KG (PPB)

	COMPOUND NAME	FRACTION	APPROXIMATE CONCENTRATION
1	NONE FOUND	VOA	

BOE-C6-0091783

CLIENT: WOODWARD CLYDE CONSULTANTS SAMPLE: WCC-12-14-3
WCAS JOB #: 16636

DATE RECEIVED: 09/17/90 RUN NUMBER: 16636V1
DATE EXTRACTED: 09/24/90 SAMPLE AMOUNT: 1.0G
DATE ANALYZED: 09/24/90 MATRIX: SOIL

VOLATILE ORGANICS (EPA 624/8240) UNITS: UG/KG (PPB)

CAS #	COMPOUND	CONCENTRATION	DET LIMIT
67-64-1	ACETONE	ND	30.
71-43-2	BENZENE	ND	5.
75-27-4	BROMODICHLOROMETHANE	ND	5.
75-25-2	BROMOFORM	ND	5.
74-83-9	BROMOMETHANE	ND	30.
78-93-3	2-BUTANONE (MEK)	ND	30.
75-15-0	CARBON DISULFIDE	ND	5.
56-23-5	CARBON TETRACHLORIDE	ND	5.
108-90-7	CHLOROBENZENE	ND	5.
75-00-3	CHLOROETHANE	ND	30.
110-75-8	2-CHLOROETHYLVINYL ETHER	ND	50.
67-66-3	CHLOROFORM	ND	5.
74-87-3	CHLOROMETHANE	ND	30.
108-41-8	CHLOROTOLUENE	ND	5.
124-48-1	DIBROMOCHLOROMETHANE	ND	5.
95-50-1	1,2-DICHLOROBENZENE	ND	5.
541-73-1	1,3-DICHLOROBENZENE	ND	5.
106-46-7	1,4-DICHLOROBENZENE	ND	5.
75-34-3	1,1-DICHLOROETHANE	ND	5.
107-06-2	1,2-DICHLOROETHANE	ND	5.
75-35-4	1,1-DICHLOROETHYLENE	ND	5.
156-59-4	CIS-1,2-DICHLOROETHYLENE	ND	5.
156-60-5	TRANS-1,2-DICHLOROETHYLENE	ND	5.
78-87-5	1,2-DICHLOROPROPANE	ND	5.
10061-01-5	CIS-1,3-DICHLOROPROPENE	ND	5.
10061-02-6	TRANS-1,3-DICHLOROPROPENE	ND	5.
100-41-4	ETHYLBENZENE	ND	5.
106-93-4	ETHYLENE DIBROMIDE	ND	5.
76-13-1	FREON-TF	ND	5.
119-78-6	2-HEXANONE	ND	30.
75-09-2	METHYLENE CHLORIDE	ND	30.
108-10-1	4-METHYL-2-PENTANONE (MIBK)	ND	30.
100-42-5	STYRENE	ND	5.
79-34-5	1,1,2,2-TETRACHLOROETHANE	ND	5.
127-18-4	TETRACHLOROETHYLENE	ND	5.
109-99-9	TETRAHYDROFURAN	ND	30.
108-88-3	TOLUENE	ND	5.
71-55-6	1,1,1-TRICHLOROETHANE	ND	5.
79-00-5	1,1,2-TRICHLOROETHANE	ND	5.
79-01-6	TRICHLOROETHYLENE	14.	5.
75-69-4	TRICHLOROFLUOROMETHANE	ND	5.
108-05-4	VINYL ACETATE	ND	30.
75-01-4	VINYL CHLORIDE	ND	30.
95-47-6	TOTAL XYLENES	ND	5.

TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT: WOODWARD CLYDE CONSULTANTS SAMPLE: WCC-12-14-3
WCAS JOB #: 16636

UNITS: UG/KG (PPB)

	COMPOUND NAME	FRACTION	APPROXIMATE CONCENTRATION
1	NONE FOUND	VOA	

BOE-C6-0091785

CLIENT: WOODWARD CLYDE CONSULTANTS SAMPLE: WCC-12-15-3
WCAS JOB #: 16636

DATE RECEIVED: 09/17/90 RUN NUMBER: 16636V2
DATE EXTRACTED: 09/24/90 SAMPLE AMOUNT: 1.0G
DATE ANALYZED: 09/24/90 MATRIX: SOIL

VOLATILE ORGANICS (EPA 624/8240) UNITS: UG/KG (PPB)

CAS #	COMPOUND	CONCENTRATION	DET LIMIT
67-64-1	ACETONE	ND	30.
71-43-2	BENZENE	ND	5.
75-27-4	BROMODICHLOROMETHANE	ND	5.
75-25-2	BROMOFORM	ND	5.
74-83-9	BROMOMETHANE	ND	30.
78-93-3	2-BUTANONE (MEK)	ND	30.
75-15-0	CARBON DISULFIDE	ND	5.
56-23-5	CARBON TETRACHLORIDE	ND	5.
108-90-7	CHLOROBENZENE	ND	5.
75-00-3	CHLOROETHANE	ND	30.
110-75-8	2-CHLOROETHYLVINYL ETHER	ND	50.
67-66-3	CHLOROFORM	ND	5.
74-87-3	CHLOROMETHANE	ND	30.
108-41-8	CHLOROTOLUENE	ND	5.
124-48-1	DIBROMOCHLOROMETHANE	ND	5.
95-50-1	1,2-DICHLOROBENZENE	ND	5.
541-73-1	1,3-DICHLOROBENZENE	ND	5.
106-46-7	1,4-DICHLOROBENZENE	ND	5.
75-34-3	1,1-DICHLOROETHANE	ND	5.
107-06-2	1,2-DICHLOROETHANE	ND	5.
75-35-4	1,1-DICHLOROETHYLENE	ND	5.
156-59-4	CIS-1,2-DICHLOROETHYLENE	ND	5.
156-60-5	TRANS-1,2-DICHLOROETHYLENE	ND	5.
78-87-5	1,2-DICHLOROPROPANE	ND	5.
10061-01-5	CIS-1,3-DICHLOROPROPENE	ND	5.
10061-02-6	TRANS-1,3-DICHLOROPROPENE	ND	5.
100-41-4	ETHYLBENZENE	ND	5.
106-93-4	ETHYLENE DIBROMIDE	ND	5.
76-13-1	FREON-TF	ND	5.
119-78-6	2-HEXANONE	ND	30.
75-09-2	METHYLENE CHLORIDE	ND	30.
108-10-1	4-METHYL-2-PENTANONE (MIBK)	ND	30.
100-42-5	STYRENE	ND	5.
79-34-5	1,1,2,2-TETRACHLOROETHANE	ND	5.
127-18-4	TETRACHLOROETHYLENE	ND	5.
109-99-9	TETRAHYDROFURAN	ND	30.
108-88-3	TOLUENE	ND	5.
71-55-6	1,1,1-TRICHLOROETHANE	ND	5.
79-00-5	1,1,2-TRICHLOROETHANE	ND	5.
79-01-6	TRICHLOROETHYLENE	26.	5.
75-69-4	TRICHLOROFLUOROMETHANE	ND	5.
108-05-4	VINYL ACETATE	ND	30.
75-01-4	VINYL CHLORIDE	ND	30.
95-47-6	TOTAL XYLENES	ND	5.

TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT: WOODWARD CLYDE CONSULTANTS SAMPLE: WCC-12-15-3
WCAS JOB #: 16636

UNITS: UG/KG (PPB)

	COMPOUND NAME	FRACTION	APPROXIMATE CONCENTRATION
1	NONE FOUND	VOA	

BOE-C6-0091787

Data Reporting Qualifiers

Value - If the result is a value greater than or equal to the Detection Limit (DL), the value is reported.

ND - Indicates that the compound was analyzed for but not detected. The minimum DL for the sample with the ND is reported based on necessary concentration or dilution actions.

TR - Indicates an estimated value. This flag is used when the mass spectral data indicates the presence of a compound that meets the identification criteria but the result is less than the specified DL but greater than zero.

Woodward-Clyde Consultants

CHAIN OF CUSTODY RECORD

SHIPMENT NO.: 1

PAGE 1 OF 2

DATE 9/17/92

PROJECT NAME: DOUGLAS AIRCRAFT Co

PROJECT NO.: 9941662 1

Sample Number	Location	Type of Sample: Material	Type of Sample: Method	Type of Container	Type of Preservation: Temp	Type of Preservation: Chemical	Analysis Required*
WCC-11-1-3	WCC-11	SOIL	DRIVE	BRASS TUBE	ICE	NONE	CONTACT
11-3-3	↓	↓	↓	↓	↓	↓	ALLSTAIRS
11-3-3	↓	↓	↓	↓	↓	↓	CALLENDAR
11-4-3	↓	↓	↓	↓	↓	↓	
11-5-3	↓	↓	↓	↓	↓	↓	
11-6-3	↓	↓	↓	↓	↓	↓	
11-7-3	↓	↓	↓	↓	↓	↓	
11-8-3	↓	↓	↓	↓	↓	↓	
11-9-3	↓	↓	↓	↓	↓	↓	
11-10-3	↓	↓	↓	↓	↓	↓	
11-11-3	↓	↓	↓	↓	↓	↓	
11-12-3	↓	↓	↓	↓	↓	↓	
11-13-3	↓	↓	↓	↓	↓	↓	
11-14-3	↓	↓	↓	↓	↓	↓	
11-16-3	↓	↓	↓	↓	↓	↓	
11-17-3	↓	↓	↓	↓	↓	↓	

Total Number of Samples Shipped: 17 | Sampler's Signature: [signature]

Relinquished By:	Received By:	Date / Time
Signature [signature] Printed Name VICTOR KEYES Company W-C C. Reason ANALYSIS	Signature [signature] Printed Name [illegible] Company [illegible]	Date 9/17/92 Time 3:37
Signature [signature] Printed Name [illegible] Company [illegible] Reason	Signature [signature] Printed Name [illegible] Company [illegible] 16636	Date 9/17/92 Time [illegible]
Signature Printed Name Company Reason	Signature Printed Name Company	Date / / Time
Signature Printed Name Company Reason	Signature Printed Name Company	Date / / Time

Special Shipment / Handling / Storage Requirements:

[illegible] WCC-11-3-3 [illegible] 7-3

* Note – This does not constitute authorization to proceed with analysis

LA/OR–0183–421

BOE-C6-0091789

Woodward-Clyde Consultants

SHIPMENT NO.: 1

CHAIN OF CUSTODY RECORD

PAGE 1 OF 2

DATE 3/17/93

PROJECT NAME: DOUGLAS AIRCRAFT CO.

PROJECT NO.: 294, F63 .1

Sample Number	Location	Type of Sample: Material	Type of Sample: Method	Type of Container	Type of Preservation: Temp	Type of Preservation: Chemical	Analysis Required*
WCC-12-1-3	WCC-12	SOIL	DRIVE	2" BRASS TUBE	ICE	NONE	CONTACT
12-2-3	"	"	"	"	"	"	ALL TARGET
12-3-3	"	"	"	"	"	"	COMPOUNDS
12-4-3	"	"	"	"	"	"	FOR
12-5-3	"	"	"	"	"	"	ANALYSIS
12-6-3	"	"	"	"	"	"	
12-7-3							
12-8-3	"	"	"	"	"	"	
12-9-3	"	"	"	"	"	"	
12-10-3	"	"	"	"	"	"	
12-11-3	"	"	"	"	"	"	
12-12-3	"	"	"	"	"	"	
12-13-3	"	"	"	"	"	"	
12-14-3	"	"	"	"	"	"	
12-15-3	"	"	"	"	"	"	
12-16-3	"	"	"	"	"	"	
12-17-3	"	"	"	"	"	"	
12-18-3	"	"	"	"	"	"	
12-19-3	"	"	"	"	"	"	

Total Number of Samples Shipped: 19 | Sampler's Signature: [signature]

Relinquished By: Signature [signature] Printed Name [illegible] Company [illegible] Reason [illegible]	Received By: Signature [signature] Printed Name [illegible] Company [illegible]	Date 3/17/93 Time [illegible]
Relinquished By: Signature [signature] Printed Name [illegible] Company [illegible] Reason [illegible]	Received By: Signature [signature] Printed Name [illegible] Company [illegible] 16636	Date [illegible] Time [illegible]
Relinquished By: Signature Printed Name Company Reason	Received By: Signature Printed Name Company	Date / / Time
Relinquished By: Signature Printed Name Company Reason	Received By: Signature Printed Name Company	Date / / Time

Special Shipment / Handling / Storage Requirements:

[illegible] Samples [illegible] WCC-12-1-3 [illegible] for WCC-12-15-3

* Note – This does not constitute authorization to proceed with analysis

LA/OR-0183-421

Woodward-Clyde Consultants

SHIPMENT NO.: 2

CHAIN OF CUSTODY RECORD

PAGE 1 OF 1

DATE 10/14/93

PROJECT NAME: DOUGLAS AIRCRAFT

PROJECT NO.: 94196J

Sample Number	Location	Type of Sample		Type of Container	Type of Preservation		Analysis Required*
		Material	Method		Temp	Chemical	
TRIP BLANK	—	WATER	—	40 ML. VOA	ICE	HCl	CONTACT
WCC-L-1	WCC-L		BAIL	" "			ALKALINITY
" L-2	"			" "			CALCIUM
WCC-B-1	WCC-B			" "			TOC
" B-2	"			"			TOTAL VOCS
WCC-HHS-1	WCC HHS			" "			
" " -2	" "			" "			
WCC-11S-1A	WCC-11S			500 ML. GLASS			
WCC 11S-1B				40 ML. GLASS			
" 11S-1B				" "			
" 11S-1C				" "			
" 11S-1D				" "			
WCC-12S-1A	WCC-12S			" "			
" 12S-1B				" "			
" 12S-1C				" "			
" 12S-1D				" "			
" 12S-1A				500 ML GLASS			

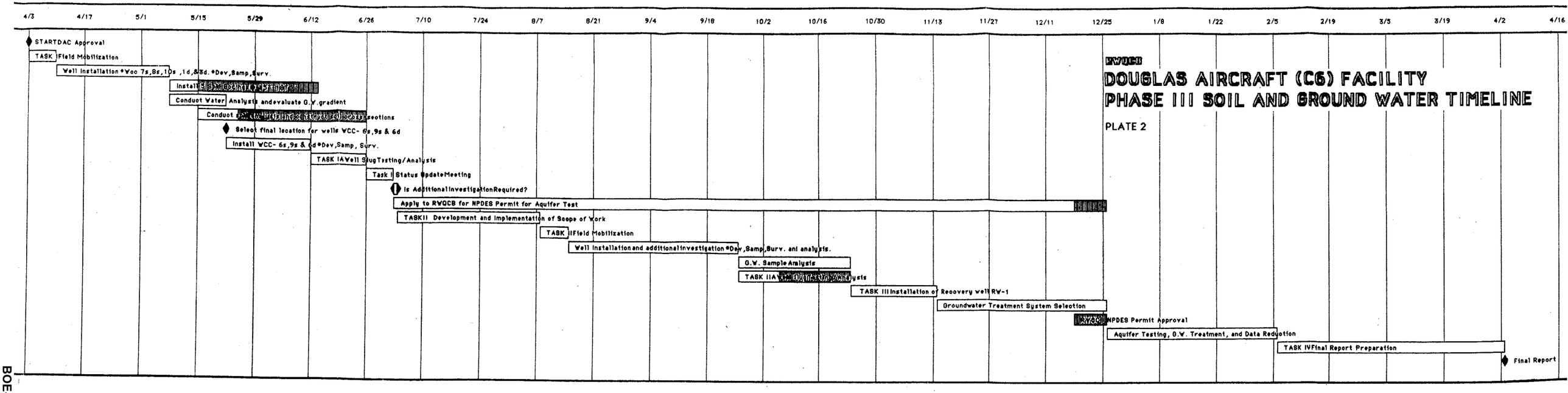
Total Number of Samples Shipped: 17 | Sampler's Signature: [signature]

Relinquished By: Signature [signature] Printed Name HECTOR REYES Company W.C.C. Reason ANALYSIS	Received By: Signature Printed Name Company 016763	Date 10/14/93 Time
Relinquished By: Signature Printed Name Company Reason	Received By: Signature Printed Name Company	Date / / Time
Relinquished By: Signature Printed Name Company Reason	Received By: Signature Printed Name Company	Date / / Time
Relinquished By: Signature Printed Name Company Reason	Received By: Signature Printed Name Company	Date / / Time

Special Shipment / Handling / Storage Requirements:

* Note – This does not constitute authorization to proceed with analysis

LA/OR-0183-421



BOE-C6-0091792